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APPENDIX 2
FOR APPLICATION

FOR

UNITED STATES LETTERS PATENT

TITLE: PREDICTING PERFORMANCE OF TELEPHONE LINES FOR DATA SERVICES

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Appendix Z

30Hz Raw Measurements:

Ytr(30) - Admittance tip-to-ring measured at 30Hz
Ytg(30) - Admittance tip-to-ground measured at 30Hz
Yrg(30) - Admittance ring-to-ground measured at 30Hz

30Hz Derived Measurements:

30Gtr - Conductance tip-to-ring measured at 30Hz = real(Ytr(30))
30Str - Susceptance tip-to-ring measured at 30Hz = imag(Ytr(30))
30Gtg - Conductance tip-to-ground measured at 30Hz = real(Ytg(30))
30Stg - Susceptance tip-to-ground measured at 30Hz = imag(Yt(30))
30Ctr - Capacitance tip-to-ring measured at 30Hz = Str(30)/(2*pi*30)
30Ctg - Capacitance tip-to-ground measured at 30Hz = St(30)/(2*pi*30)
Lmeas - Length in kft measured at 30Hz = 30Ctg/17.47

150Hz-20KHz Raw Measurements:

Ytr(f) - Admittance tip-to-ring where f=150Hz,600Hz,1050Hz,1500Hz,...19950Hz
Ytg(f) - Admittance tip-to-ground where f=150Hz,600Hz,1050Hz,1500Hz,...19950Hz
Yrg(f) - Admittance ring-to-ground where f=150Hz,600Hz,1050Hz,1500Hz,...19950Hz

150Hz-20KHz Derived Measurements:

150Gtr - Conductance tip-to-ring measured at 150Hz = real(Ytr(150))
600Gtr - Conductance tip-to-ring measured at 600Hz = real(Ytr(600))

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19950Gtr - Conductance tip-to-ring measured at 19950Hz = real(Ytr(19950))

150Str - Susceptance tip-to-ring measured at 150Hz = imag(Ytr(150))
600Str - Susceptance tip-to-ring measured at 600Hz = imag(Ytr(600))

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19950Str - Susceptance tip-to-ring measured at 19950Hz = imag(Ytg(19950))

150Gtg - Conductance tip-to-ground measured at 150Hz = real(Ytg(150))
600Gtg - Conductance tip-to- ground measured at 600Hz = real(Ytg(600))

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19950Gtg - Conductance tip-to- ground measured at 19950Hz = real(Ytg(19950))

150Stg - Susceptance tip-to- ground measured at 150Hz = imag(Ytg(150))
600Stg - Susceptance tip-to- ground measured at 600Hz = imag(Ytg(600))

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19950Stg - Susceptance tip-to- ground measured at 19950Hz = imag(Ytg(19950))

150Ctr - Capacitance tip-to-ring measured at 150Hz = 150Str/(2*pi*150)
600Ctr - Capacitance tip-to-ring measured at 600Hz = 600Str/(2*pi*600)

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19950Ctr - Capacitance tip-to-ring measured at 19950Hz = 19950Str/(2*pi*19950)

150Ctg - Capacitance tip-to-ground measured at 150Hz = 150Stg/(2*pi*150)
600Ctg - Capacitance tip-to-ground measured at 600Hz = 600Stg/(2*pi*600)

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19950Ctg - Capacitance tip-to-ground measured at 19950Hz = 19950Stg/(2*pi*19950)

150Hz-20KHz Secondary Derived Measurements:

C30/C4K - Ratio of tip-to-ground Capacitance at 30Hz to 4200Hz
C4K/C10K - Ratio of tip-to-ground Capacitance at 4200Hz to 10050Hz
Cslope - Tip-to-ground Capacitance ratio slope = (C4K/C10K)/(C30/C4K)
C30-C4K - Difference in tip-to-ground Capacitance at 30Hz and 4200Hz
C4K-C10K - Difference in tip-to-ground Capacitance at 4200Hz and 10050Hz
Cdelta - Tip-to-ground Capacitance difference delta = (C4K-C10K)/(C30-C4K)

G4K/G30 - Ratio of tip-to-ground Conductance at 4200Hz to 30Hz
G10K/G4K - Ratio of tip-to-ground Conductance at 10050Hz to 4200Hz
Gslope - Tip-to-ground Conductance ratio slope = (G10K/G4K)/(G4K/G30)
G4K-G30 - Difference in tip-to-ground Conductance at 30Hz and 4200Hz
G10K-G4K - Difference in tip-to-ground Conductance at 4200Hz and 10050Hz
Gdelta - Tip-to-ground Conductance difference delta = (G10K-G4K)/(G4K-G30)

C30/G30 - Ratio of Tip-to-ground Capacitance to Conductance at 30Hz
C30/G4K - Ratio of Tip-to-ground Capacitance at 30Hz to Conductance at 4200Hz
C4K/G4K - Ration of Tip-to-ground Capacitance to Conductance at 4200Hz

Gtr_dmax - Maximum positive slope of Gtr(f) = max(derivative(Gtr(f)/df))
Gtr_fmax - Frequency at which Gtr_dmax occurs
Gtr_dmin - Maximum negative slope of Gtr(f) = min(derivative(Gtr(f)/df))
Gtr_fmin - Frequency at which Gtr_dmin occurs
Gtr_fpk - Frequency of first peak (local maxima)in Gtr(f)
Gtr_fval - Frequency of first valley(local minima)in Gtr(f)
Gtr_d_delta - Gtr Max/Min Derivative difference = Gtr_dmax-Gtr_dmin
Gtr_pk_delta - Gtr peak/valley frequency difference = Gtr_fval-Gtr_fpk
Gtr_pk - Value of Gtr(f) at frequency Gtr_fpk
Gtr_val - Value of Gtr(f) at frequency Gtr_fval
Gtr_delta - Gtr peak/valley difference = Gtr_pk-Gtr_val

Gtg_dmax - Maximum positive slope of Gtg(f) = max(derivative(Gtg(f)/df))
Gtg_fmax - Frequency at which Gtg_dmax occurs
Gtg_dmin - Maximum negative slope of Gtg(f) = min(derivative(Gtg(f)/df))
Gtg_fmin - Frequency at which Gtg_dmin occurs
Gtg_d_delta - Gtg Max/Min Derivative difference = Gtg_dmax-Gtg_dmin

Ctr_dmax - Maximum positive slope of Ctr(f) = max(derivative(Ctr(f)/df))
Ctr_fmax - Frequency at which Ctr_dmax occurs
Ctr_dmin - Maximum negative slope of Ctr(f) = min(derivative(Ctr(f)/df))
Ctr_fmin - Frequency at which Ctr_dmin occurs
Ctr_fpk - Frequency of first peak (local maxima)in Ctr(f)
Ctr_fval - Frequency of first valley(local minima)in Ctr(f)
Ctr_d_delta - Ctr Max/Min Derivative difference = Ctr_dmax-Ctr_dmin
Ctr_pk_delta - Ctr peak/valley frequency difference = Ctr_fval-Ctr_fpk
Ctr_val - Value of Ctr(f) at frequency Ctr_fval

Ctg_dmax - Maximum positive slope of Ctg(f) = max(derivative(Ctg(f)/df))
Ctg_fmax - Frequency at which Ctg_dmax occurs
Ctg_dmin - Maximum negative slope of Ctg(f) = min(derivative(Ctg(f)/df))
Ctg_fmin - Frequency at which Ctg_dmin occurs
Ctg_d_delta - Ctg Max/Min Derivative difference = Ctg_dmax-Ctg_dmin

Str_dmax - Maximum positive slope of Str(f) = max(derivative(Str(f)/df))
Str_fmax - Frequency at which Str_dmax occurs
Str_dmin - Maximum negative slope of Str(f) = min(derivative(Str(f)/df))
Str_fmin - Frequency at which Str_dmin occurs

150Hz-20KHz Secondary Derived Measurements:

Str_fpk - Frequency of first peak (local maxima) in Str(f)
Str_fval - Frequency of first valley(local minima) in Str(f)
Str_d_delta - Str Max/Min Derivative difference = Str_dmax-Str_dmin
Str_pk_delta - Str peak/valley frequency difference = Str_fval-Str_fpk
Str_pk - Value of Str(f) at frequency Str_fpk
Str_val - Value of Str(f) at frequency Str_fval
Str_delta - Str peak/valley difference = Str_pk-Str_val

Stg_dmax - Maximum positive slope of Stg(f) = max(derivative(Stg(f)/df))
Stg_fmax - Frequency at which Stg_dmax occurs
Stg_dmin - Maximum negative slope of Stg(f) = min(derivative(Stg(f)/df))
Stg_fmin - Frequency at which Stg_dmin occurs
Stg_fpk - Frequency of first peak (local maxima) in Stg(f)
Stg_fval - Frequency of first valley(local minima) in Stg(f)
Stg_d_delta - Stg Max/Min Derivative difference = Stg_dmax-Stg_dmin
Stg_pk_delta - Stg peak/valley frequency difference = Stg_fval-Stg_fpk

Gtg20k/Gtg8k - Ratio of Gtg at 19950Hz and 8250Hz
Gtg20k/Gtg4k - Ratio of Gtg at 19950Hz and 4200Hz
Cgt30/Cgt20k - Ratio of Ctg at 30Hz and 19950Hz
Cgt30/Cgt8k - Ratio of Ctg at 30Hz and 8250Hz